Remarks/Arguments

These remarks are provided in response to the final Office Action mailed January 19, 2010.

The rejections set forth in the final Office Action are addressed below. As a preliminary matter, Applicant notes that claims 5-9 have not been rejected in the final Office Action. Accordingly, Applicant has treated claims 5-9 as if they are allowed, and Applicant reserves the right to rewrite these claims in independent form. Applicant respectfully requests that the Examiner clarify the status of claims 5-9 in the next written communication.

Claims 1, 2, 17, and 18 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Archer et al. (US 4,969,408). Claims 3, 4, 10-16, and 19 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Archer.

Applicant respectfully traverses these rejections.

Claim 1 defines a method for real-time, online monitoring of a fossil fuel converter apparatus by using precise mathematical modeling. As recited in claim 1, an online monitoring device stores: the number of variables of the reactant, fossil fuel, and resultant compositions; a relationship between the fossil fuel compositions and a calorific value; an equation set involving material and energy balance relationships of the compositions; and given conditions comprising independent relationships of the variables. Operating data of the fossil fuel converter apparatus is measured. In an exemplary implementation of the method, the variables defined in steps a) and c) may be measured or treated as known variables by assigning values to each. The equation set is solved to compute real-time monitoring data. (For example, the aforementioned

implementation, the fossil fuel composition variables b) are determined through mathematic analysis.)

Archer discloses a method for online monitoring of a fossil fuel converter apparatus. Archer's method involves steps of measuring operating data such as coal composition, oxygen concentration, heating value, and boiler operating coal conditions. Archer measures compositional data using a bulk material analyzer, which in turn uses nuclear radiation. Archer then uses the measured data as "input for ***estimating***" certain "limits" such as the minimum air/fuel ratio which will prevent localized oxygen depletion in the furnace. (Col. 4, lines 31-36; Abstract, lines 13-22) (emphasis added). Archer takes these "limits" and "***predicts***" how to alter operating conditions to attain a desired result, such as "how varying the air supply rate affects sensible heat loss." (Abstract, lines 11-13) (emphasis added). As an example, at column 4, lines 40-54, Archer sets lower limits L_1 (or L_2) for maintaining a requisite concentration of oxygen and preventing excessive temperatures that would cause ash deposition. Depending upon the stated object, these limits are then used to predict air flow rate M_1 for accomplishing the desired object.

While the methods defined in claim 1 and Archer both involve online monitoring of a fossil fuel converter, their similarities end there. Unlike the method defined in claim 1, Archer's method does not store or solve an equation set involving the material and energy balance relationships of the fossil fuel, reactant, and resultant compositions or "given conditions" comprising independent relationships of the variables. Whereas the above-discussed implementation determines fuel composition through solution of the equation set, Archer uses a bulk material analyzer to measure the fossil fuel

compositional data, and based on the data then estimates limits (L_1 or L_2) and predicts a modified operating condition (e.g., M_1) to attain desired performance. In view of Archer's use of its bulk material analyzer to measure fuel composition values, Archer provides no suggestion of using an equation set for mathematical modeling, or using measured operating data and stored independent relationships to solve an equation set to determine fuel compositions.

The method of claim 1 successfully combines fuel composition modeling with boiler operating energy and mass balance modeling to determine variables, such as fuel compositions. In this manner, claim 1 advantageously may be practiced without use of a bulk material analyzer. This is a significant advantage over the art, because a bulk material analyzer is unsuitable for industrial use where hundreds of tons of coal may be fed to a coal feeder.

For the above reasons, Applicant respectfully submits that claim 1 and claims 2-4, 10-16, and 19 which depend from claim 1 are patentable over Archer.

Applicant further respectfully submits that Archer fails to disclose or reasonably suggest the added features of rejected dependent claims. For example, claim 3 recites steps of setting certain variables to zero. Archer has no need to carry out this step, because Archer is not solving an equation set. The equations and "given" conditions of claim 3 are likewise not suggested by Archer. For these additional reasons, Applicant respectfully submits that the rejection is misplaced and should be withdrawn.

Independent claim 17 is directed to an online monitoring device for real-time monitoring of a fossil fuel converter apparatus.

Archer discloses an apparatus for online monitoring of a fossil fuel converter apparatus. Archer's apparatus measures operating data such as coal composition, oxygen concentration, heating value, and boiler operating coal conditions. Archer measures compositional data using a bulk material analyzer, which in turn uses nuclear radiation. Archer then uses the measured data as "input for ***estimating***" certain "limits" such as the minimum air/fuel ratio which will prevent localized oxygen depletion in the furnace. (Col. 4, lines 31-36; Abstract, lines 13-22) (emphasis added). Archer takes these "limits" and "***predicts***" how to alter operating conditions to attain a desired result, such as "how varying the air supply rate affects sensible heat loss." (Abstract, lines 11-13) (emphasis added). As an example, at column 4, lines 40-54, Archer sets lower limits L_1 (or L_2) for maintaining a requisite concentration of oxygen and preventing excessive temperatures that would cause ash deposition. Depending upon the stated object, these limits are then used to predict air flow rate M_1 for accomplishing the desired object.

The respective devices/apparatus defined in claim 17 and disclosed in Archer both perform online monitoring of fossil fuel converters. However, the devices use different components in strikingly different manners. Unlike the device defined in claim 17, Archer's device does not store or solve an equation set involving the material and energy balance relationships of the fossil fuel, reactant, and resultant compositions or "given conditions" comprising independent relationships of the variables. Rather, Archer uses a bulk material analyzer to measure compositional data, and based on the data then estimates limits (L_1 or L_2) and predicts a modified operating condition (e.g., M_1) to attain desired performance. Archer does not suggest means for solving an equation set for

mathematical modeling, or using measured operating data and stored independent relationships to solve an equation set.

The apparatus of claim 17 successfully combines fuel composition modeling with boiler operating energy and mass balance modeling to determine fuel compositions. In this manner, claim 17 advantageously may be practiced without use of a bulk material analyzer, which in practice is unsuitable for industrial use where hundreds of tons of coal may be fed to a coal feeder.

For the above reasons, Applicant respectfully submits that claim 17 and claim 18 which depends from claim 17 are patentable over Archer.

The application is believed to be placed in condition for allowance. Accordingly, reconsideration of the rejections and issuance of a Notice of Allowance are earnestly solicited. In the event any outstanding issue is found to exist, the Examiner is urged to contact the undersigned for expeditious resolution.

Respectfully submitted,

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